H

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/084,894	02/27/2002	Joseph L. Dallas	CVI-0011	8175

23413 7590 12/18/2003

CANTOR COLBURN, LLP
55 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

EXAMINER	
LEE, HWA S	

ART UNIT	PAPER NUMBER
2877	

DATE MAILED: 12/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/084,894	DALLAS ET AL.	
	Examiner	Art Unit	
	Andrew H. Lee	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.

4) ☐ Interview Summary (PTO-413) Paper No(s). _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: .

DETAILED ACTION

Claim Objections

1. Claim 3 is objected to because of the following informalities: The variable "Z" is not defined. For examination purposes, it will be assumed that Z is the distance from the transmission members to the target plane. Appropriate correction is required.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

   1. Determining the scope and contents of the prior art.
   2. Ascertaining the differences between the prior art and the claims at issue.
   3. Resolving the level of ordinary skill in the pertinent art.
   4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. **Claims 1, 3, 5, 8, and 11** are rejected under 35 U.S.C. 103(a) as being unpatentable over Jenkins et al (Fundamentals of Optics) in view of Leuchs et al (Us 5,172,185).

For **claims 1 and 5,** Jenkins et al (Jenkins hereinafter) on page 264 shows a Young's interferometer comprising:

directing a monochromatic light from a single light source (S) to two or more optical transmission members (S_1 and S_2) in an array;

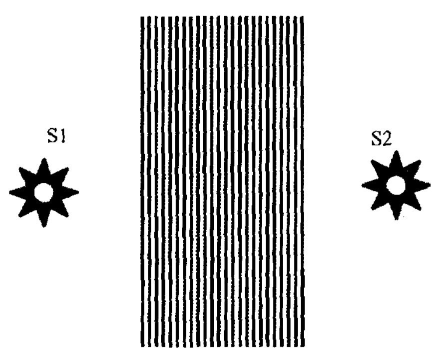
creating an optical interference pattern between the monochromatic light emanating from the two or more optical transmission members; and

characterizing the optical interference pattern.

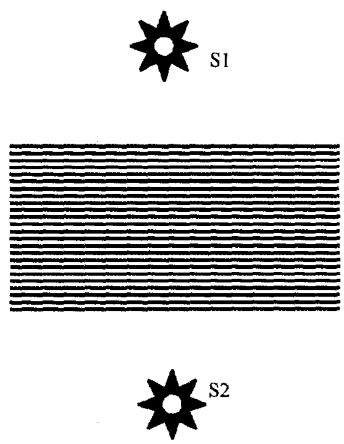
Jenkins does not expressly show that the light source is a laser and does not expressly show that information about a position of the optical transmission members is obtained.

Jenkins shows that the distance information can be obtained since the interference patterns are directly proportional to the distance D, inversely proportional to the distance between the two optical transmission members (d), and directly proportional to the wavelength of the light source (λ). Furthermore for the examples shown by Jenkins and as is generally known in the art, one of ordinary skill in the art would observe that the fringes lie perpendicular to a line defined by the two light sources and any observed tilt of the fringes would be due to the relative position of the optical transmission members (S_1 and S_2).

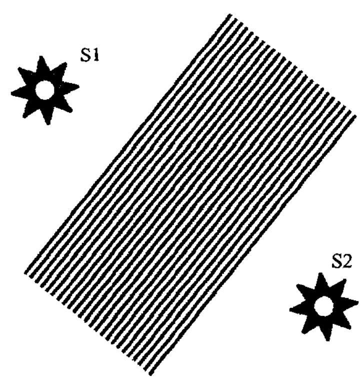
For example, in the first schematic diagram below, it shows two optical transmission members (S_1 and S_2) in a horizontal arrangement so the fringes would lie vertically (known axis of **claim 5**).



If, in the instance, that the two optical transmission members (S_1 and S_2) are in a vertical arrangement, the fringes would lie horizontally as shown in the diagram below:



If the optical transmission members (S_1 and S_2) are at an angle to each other, the fringes would lie at the same angle as shown in the diagram below:



Thus it would be obvious to one of ordinary skill in the art that information about the relative position of the optical transmission members are obtained.

As for Jenkins not expressly showing a laser being used as a light source, Leuchs et al (Leuchs hereinafter) shows a Young's interferometer wherein a laser is used as a light source.

At the time of the invention, one of ordinary skill in the art would have used a laser as a light source since Jenkins suggests the use of a monochromatic light and lasers meet Jenkins's

suggestion in that a laser provides light that is monochromatic, tunable, stable, and provides accuracy in measurements because light from lasers are coherent.

For **claim 3**, Jenkins teaches the equation that the distance between two successive fringes is equal to $\lambda D/d$, where D is the distance of the optical transmission member to the target plane (detector plane), d is the distance between the optical transmission members and λ is the wavelength of the light source.

For **claim 8**, the two optical fibers would constitute a one-dimensional array.

For **claim 11**, Jenkins does not expressly show that the optical transmission members are optical fibers. Leuchs shows optical fibers used as the point sources in the interferometer. At the time of the invention, one of ordinary skill in the art would have be motivated to use optical fibers as the point sources or slits of the Young's interferometer in order to have the flexibility and adjustability of locating the point sources.

4. **Claim 2** is rejected under 35 U.S.C. 103(a) as being unpatentable over Jenkins and Leuchs as applied to claim 1 above, and further in view of Kuwayama (US 4,932,781).

Jenkins and Leuchs show all the limitations including measuring the distance between the fringes but does not expressly show the comparing of the measured distance with a pre-determined value.

Kuwayama shows the comparing of the fringe distance in order to measure gap with a pre-determined value (column 3, lines 67+).

At the time of the invention, one of ordinary skill in the art would have compared the measured distance with a pre-determined value in order to save time by not having to perform the actual calculations but quickly comparing the measured values with known reference values.

5. **Claims 4, 7, and 9** are rejected under 35 U.S.C. 103(a) as being unpatentable over Jenkins and Leuchs as applied to claim 1 above, and further in view of DiMascio et al (US 2002/0159729)

As for **claim 4**, Jenkins and Leuchs do not expressly show resolving the interference fringes in the optical in the optical interference pattern into horizontal and vertical components.

DiMascio shows the desire to obtain information about the position of the two or more optical transmission members (optical fibers) (paragraph [0026] on page 3).

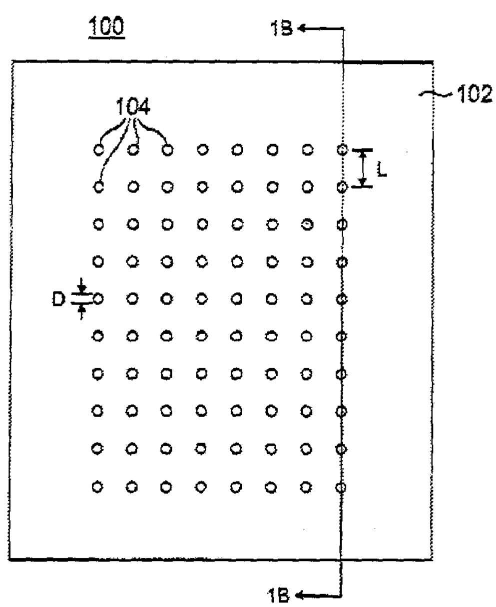
As observed for claim 1, one of ordinary skill in the art would recognize that there is a direct correlation of the tilt of the fringes with the relative alignment of the two optical transmission members and that the use of simple trigonometry indicates the relative position of the optical transmission members.

At the time of the invention, one of ordinary skill in the art would have been motivated to use Young's interferometer shown by Jenkins and Leuchs in order to obtain the position of the optical fibers and furthermore would have used trigonometry of general knowledge to one of ordinary skill in the art to obtain the positions of the optical transmission members, and that the use of trigonometry involves resolving the tilt of the fringes in the horizontal and vertical components (cosine and sine) indicates the angle of the tilt and thus the angular position of the optical transmission members. Thus it would be within general knowledge to one of ordinary skill in the art to calculate the relative position of one optical transmission member to the other

by calculating the distance between the two optical transmission member (d) and measuring the tilt of the fringe.

As for **claims 7 and 9** Jenkins and Leuchs show all the limitations but does not show actively aligning or adjusting at least one of the two or more optical transmission members that are in a two dimensional array, wherein the optical transmission members are in different rows, in response to the information about the position or distance of the two or more optical transmission members. Furthermore, Leuchs shows that the optical transmission members can be optical fibers.

DiMascio et al (DiMascio hereinafter) show actively aligning at least one of the two or more optical transmission members (optical fibers) in response to the information about the position of the two or more optical transmission members (paragraph [0026] on page 3).



At the time of the invention, one of ordinary skill in the art would have been motivated to combine the principles of Young's interferometer shown by Jenkins with Leuchs to measure positional information of the fiber optics and DiMascio to actively align at least one of the two

or more optical fibers in a two dimensional array wherein the fiber optics are in different rows as shown in Figure 1A in response to the information about the position of the two or more optical transmission members.

A skilled artisan would have been motivated to do so in order to reduce the number of optical elements required for the measurement which results in simpler compact construction (Leuchs column 1, lines 54+) and the ease of aligning optical elements since Jenkins shows that Young's interferometer uses very few optical elements comprising of two pinpoint light sources taught by Leuchs (column 1, lines 55+) and a means for detecting the interference pattern.

6. **Claim 6** is rejected under 35 U.S.C. 103(a) as being unpatentable over Jenkins and Leuchs as applied to claim 1 above, and further in view of Takishima et al (US 6,018,393).

Jenkins and Leuchs show all the limitations but does not expressly show capturing the optical interference pattern with a digital video camera and generating a digital representation of the captured optical interference pattern.

Takishima et al (Takishima hereinafter) show capturing the optical interference pattern with a digital video camera; and generating a digital representation of the captured optical interference pattern.

At the time of the invention, one of ordinary skill in the art would have captured the optical interference pattern with a digital video camera and generated a digital representation of the captured optical interference pattern in order to automate the fringe analysis through the use of a computer rather than manually measuring and calculating the fringe spacing.

7. **Claim 10** is rejected under 35 U.S.C. 103(a) as being unpatentable over Jenkins, Leuchs, and DiMascio as applied to claim 9 above, and further in view of Ford et al (6,337,935)

Jenkins, Leuchs, and DiMascio do not expressly show that any of the optical transmission members are waveguides or an array of waveguides.

Ford et al (Ford hereinafter) teaches that for optical fibers and waveguides are functional equivalents in that they both function as point sources, and because these are art-recognized equivalents, it is obvious to substitute any or all of the optical fibers with waveguides to form an array since waveguides are more compact and easier to manufacture.

8. **Claim 12** is rejected under 35 U.S.C. 103(a) as being unpatentable over Jenkins and Leuchs as applied to claim 1 above, and further in view of Ford.

Jenkins, Leuchs, and DiMascio do not expressly show that any of the optical transmission members are waveguides.

Ford teaches that for optical fibers and waveguides are functional equivalents in that they both function as point sources, and because these are art-recognized equivalents, it is obvious to substitute any or all of the optical fibers with waveguides since waveguides are more compact and easier to manufacture.

9. **Claims 13 , 21, and 22** are rejected under 35 U.S.C. 103(a) as being unpatentable over Jenkins in view of Leuchs.

Jenkins on page 264 shows a Young's interferometer comprising:

illuminating a first optical transmission member (S_1) in an array and a second and a second optical transmission member (S_2) in an array with a monochromatic light;

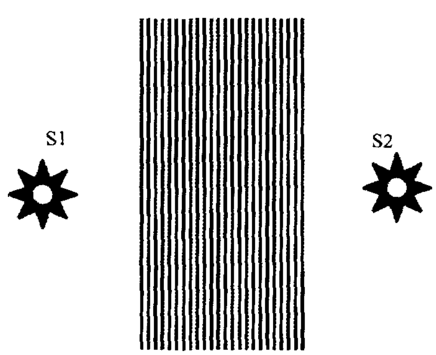
creating an optical interference pattern between the monochromatic light emanating from the first optical transmission member and a second optical transmission member; and

characterizing the optical interference pattern.

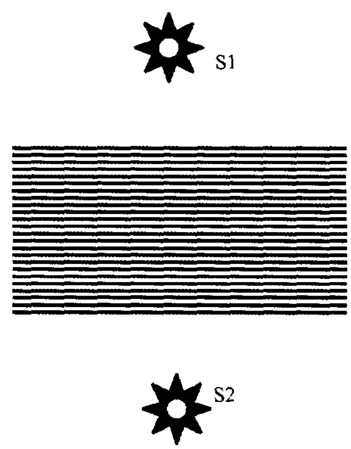
Jenkins does not expressly show that the light source is a laser and does not expressly show that information about a position of the second optical transmission members relative to the first optical transmission member is obtained.

Jenkins shows that the distance information can be obtained since the interference patterns are directly proportional to the distance D, inversely proportional to the distance between the two optical transmission members (d), and directly proportional to the wavelength of the light source (λ). Furthermore for the examples shown by Jenkins and as is generally known in the art, one of ordinary skill in the art would observe that the fringes lie perpendicular to a line defined by the two light sources and any observed tilt of the fringes would be due to the relative position of the optical transmission members (S_1 and S_2).

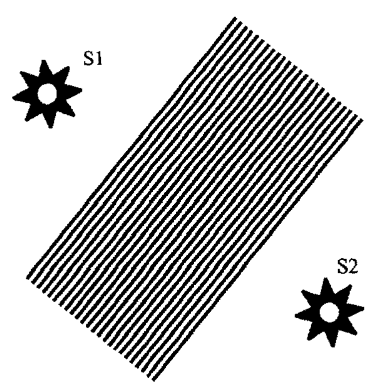
For example, in the first schematic diagram below, it shows two optical transmission members (S_1 and S_2) in a horizontal arrangement so the fringes would lie vertically (known axis of **claim 16**).



If, in the instance, that the two optical transmission members (S_1 and S_2) are in a vertical arrangement, the fringes would lie horizontally as shown in the diagram below:



If the optical transmission members (S_1 and S_2) are at an angle to each other, the fringes would lie at the same angle as shown in the diagram below:



Thus it would be obvious to one of ordinary skill in the art that information about the relative position of the optical transmission members are obtained.

As for Jenkins not expressly showing a laser being used as a light source, Leuchs shows a Young's interferometer wherein a laser is used as a light source.

At the time of the invention, one of ordinary skill in the art would have used a laser as a light source since Jenkins suggests the use of a monochromatic light and lasers meet Jenkins's

suggestion in that a laser provides light that is monochromatic, tunable, stable, and provides accuracy in measurements because light from lasers are coherent.

As for **claim 21**, the two optical transmission members constitute a one dimensional array.

For **claim 22**, Jenkins does not expressly show that the optical transmission members are optical fibers. Leuchs shows optical fibers used as the point sources in the interferometer. At the time of the invention, one of ordinary skill in the art would have be motivated to use optical fibers as the point sources or slits of the Young's interferometer in order to have the flexibility and adjustability of locating the point sources.

10. **Claims 14 and 16** rejected under 35 U.S.C. 103(a) as being unpatentable over Jenkins and Leuchs as applied to claim 13 above, and further in view of Kuwayama.

Jenkins and Leuchs show all the limitations including measuring the distance between the fringes but does not expressly show the comparing of the measured distance with a pre-determined value.

As for claim 16, please see the rejection of claim 13 above.

Kuwayama shows the comparing of the fringe distance with a pre-determined value (column 3, lines 67+).

At the time of the invention, one of ordinary skill in the art would have compared the measured distance with a pre-determined value in order to save time by not having to perform the actual calculations but quickly comparing the measured values with known reference values.

11. **Claim 15** is rejected under 35 U.S.C. 103(a) as being unpatentable over Jenkins, Leuchs, and Kuwayama as applied to claim 14 above, and **Claims 18 and 20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Jenkins, Leuchs as applied to claim 1 above, and further in view of DiMascio.

Jenkins and Leuchs show all the limitations but does not show actively aligning or adjusting at least one of the two or more optical transmission members in response to the information about the position or distance of the two or more optical transmission members.

DiMascio shows the desire to obtain information about the position of the two or more optical transmission members (optical fibers) (paragraph [0026] on page 3).

As observed for claim 13, it is of general knowledge to one of ordinary skill in the art that there is a direct correlation of the tilt of the fringes with the relative alignment of the two optical transmission members and that the use of simple trigonometry indicates the relative position of the optical transmission members.

At the time of the invention, one of ordinary skill in the art would have been motivated to use Young's interferometer shown by Jenkins and Leuchs in order to obtain the position of the optical fibers and furthermore would have used trigonometry of general knowledge to one of ordinary skill in the art to obtain the positions of the optical transmission members, and that the use of trigonometry involves resolving the tilt of the fringes in the horizontal and vertical components (cosine and sine) indicates the angle of the tilt and thus the angular position of the optical transmission members. Thus it would be within general knowledge to one of ordinary skill in the art to calculate the relative position of one optical transmission member to the other by calculating the distance between the two optical transmission member (d) and measuring the tilt of the fringe.

Furthermore, Leuchs shows that the optical transmission members can be optical fibers.

DiMascio show actively aligning at least one of the two or more optical transmission members (optical fibers) in response to the information about the position of the two or more optical transmission members (paragraph [0026] on page 3).

At the time of the invention, one of ordinary skill in the art would have been motivated to combine the principles of Young's interferometer shown by Jenkins with Leuchs to measure positional information of the fiber optics and DiMascio to actively align at least one of the two or more optical fibers in a two dimensional array **(claim 18)** wherein the fiber optics are in different rows **(claim 20)** as shown in Figure 1A in response to the information about the position of the two or more optical transmission members.

A skilled artisan would have been motivated to do so in order to reduce the number of optical elements required for the measurement which results in simpler compact construction (Leuchs column 1, lines 54+) and the ease of aligning optical elements since Jenkins shows that Young's interferometer uses very few optical elements comprising of two pinpoint light sources taught by Leuchs (column 1, lines 55+) and a means for detecting the interference pattern.

12. **Claim 17** is rejected under 35 U.S.C. 103(a) as being unpatentable over Jenkins and Leuchs, as applied to claim 16 above, and further in view of DiMascio.

Jenkins and Leuchs show all the limitations but does not show actively aligning or adjusting at least one of the two or more optical transmission members in response to the information about the position or distance of the two or more optical transmission members.

DiMascio shows the desire to obtain information about the position of the two or more optical transmission members (optical fibers) (paragraph [0026] on page 3).

As observed for claim 13, it is of general knowledge to one of ordinary skill in the art that there is a direct correlation of the tilt of the fringes with the relative alignment of the two optical transmission members and that the use of simple trigonometry indicates the relative position of the optical transmission members.

At the time of the invention, one of ordinary skill in the art would have been motivated to use Young's interferometer shown by Jenkins and Leuchs in order to obtain the position of the optical fibers and furthermore would have used trigonometry of general knowledge to one of ordinary skill in the art to obtain the positions of the optical transmission members, and that the use of trigonometry involves resolving the tilt of the fringes in the horizontal and vertical components (cosine and sine) indicates the angle of the tilt and thus the angular position of the optical transmission members. Thus it would be within general knowledge to one of ordinary skill in the art to calculate the relative position of one optical transmission member to the other by calculating the distance between the two optical transmission member (d) and measuring the tilt of the fringe.

Furthermore, Leuchs shows that the optical transmission members can be optical fibers.

DiMascio show actively aligning at least one of the two or more optical transmission members (optical fibers) in response to the information about the position of the two or more optical transmission members (paragraph [0026] on page 3).

At the time of the invention, one of ordinary skill in the art would have been motivated to combine the principles of Young's interferometer shown by Jenkins with Leuchs to measure positional information of the fiber optics and DiMascio to actively align at least one of the two or more optical fibers in a two dimensional array wherein the fiber optics are in different rows

as shown in Figure 1A in response to the information about the position of the two or more optical transmission members.

A skilled artisan would have been motivated to do so in order to reduce the number of optical elements required for the measurement which results in simpler compact construction (Leuchs column 1, lines 54+) and the ease of aligning optical elements since Jenkins shows that Young's interferometer uses very few optical elements comprising of two pinpoint light sources taught by Leuchs (column 1, lines 55+) and a means for detecting the interference pattern.

13. **Claim 19** is rejected under 35 U.S.C. 103(a) as being unpatentable over Jenkins, Leuchs, Kuwayam, and DiMascio as applied to claim 18 above, and further in view of Ford.

Jenkins, Leuchs, Kuwayam, and DiMascio do not expressly show that any of the optical transmission members are waveguides or an array of waveguides.

Ford et al (Ford hereinafter) teaches that for optical fibers and waveguides are functional equivalents in that they both function as point sources, and because these are art-recognized equivalents, it is obvious to substitute any or all of the optical fibers with waveguides to form an array since waveguides are more compact and easier to manufacture.

14. **Claim 23** is rejected under 35 U.S.C. 103(a) as being unpatentable over Jenkins and Leuchs as applied to claim 13 above, and further in view of Ford.

Jenkins and Leuchs do not expressly show that any of the optical transmission members are waveguides but are point sources or optical fibers.

Ford teaches that for optical fibers and waveguides are functional equivalents in that they both function as point sources, and because these are art-recognized equivalents, it is obvious to

substitute any or all of the optical fibers with waveguides since waveguides are more compact and easier to manufacture.

15. **Claim 24** is rejected under 35 U.S.C. 103(a) as being unpatentable over Jenkins in view of Leuchs.

For **claim 24,** Jenkins on page 264 shows a Young's interferometer comprising:

a light source configured to provide monochromatic light to two or more optical transmission members (S_1 and S_2) in an array;

a target plane arranged to receive the monochromatic light emanating from the two or more optical transmission members; and

wherein the light emanating from the two or more optical transmission members forms an interference pattern on the target plane, the interference pattern including a characteristic indicating a position of the two or more optical transmission members since the tilt and fringe distances indicate the position of the optical transmission members.

Jenkins does not expressly show that the monochromatic light source is a laser.

Leuchs shows a Young's interferometer wherein a laser is used as a light source.

At the time of the invention, one of ordinary skill in the art would have used a laser as a light source since Jenkins suggests the use of a monochromatic light and lasers meet Jenkins's suggestion in that a laser provides light that is monochromatic, tunable, stable, and provides accuracy in measurements because light from lasers are coherent.

16. **Claim 25** is rejected under 35 U.S.C. 103(a) as being unpatentable over Jenkins and Leuchs as applied to claim 24 above, and further in view of Takishima.

Jenkins and Leuchs show all the limitations but does not expressly show capturing the optical interference pattern with a digital video camera and generating a digital representation of the captured optical interference pattern.

Takishima shows capturing the optical interference pattern with an image receiver (10) configured to convert light received at the target plane into digital signals indicating the optical interference pattern and a computer (11).

At the time of the invention, one of ordinary skill in the art would have captured the optical interference pattern with an image receiver and generated a digital representation of the captured optical interference pattern in order to automate the fringe analysis through the use of a computer rather than manually measuring and calculating the fringe spacing.

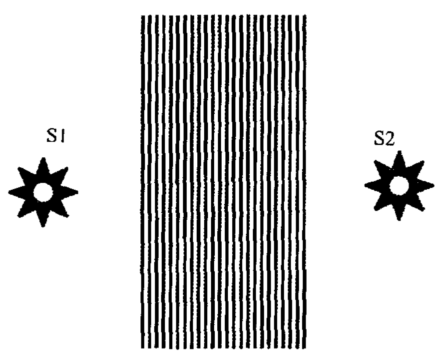
17. **Claims 26 is** rejected under 35 U.S.C. 103(a) as being unpatentable over Jenkins, Leuchs, and Takishima et al as applied to claim 25 above and **Claims 27 and 29-31** are rejected under 35 U.S.C. 103(a) as being unpatentable over Jenkins and Leuchs as applied to claim 24 above, and further in view of DiMascio.

Jenkins, Leuchs, and Takishima et al show all the limitations but does not show actively aligning or adjusting at least one of the two or more optical transmission members in response to the information about the position or distance of the two or more optical transmission members.

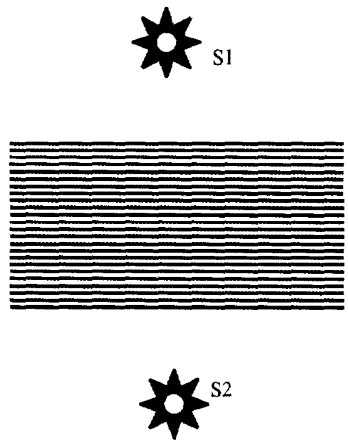
DiMascio show actively aligning at least one of the two or more optical transmission members (optical fibers) in response to the information about the position of the two or more optical transmission members (paragraph [0026] on page 3).

Jenkins shows that the distance information can be obtained since the interference patterns are directly proportional to the distance D, inversely proportional to the distance between the two optical transmission members (d), and directly proportional to the wavelength of the light source (λ). Furthermore for the examples shown by Jenkins and as is generally known in the art, one of ordinary skill in the art would observe that the fringes lie perpendicular to a line defined by the two light sources and any observed tilt of the fringes would be due to the relative position of the optical transmission members (S_1 and S_2).

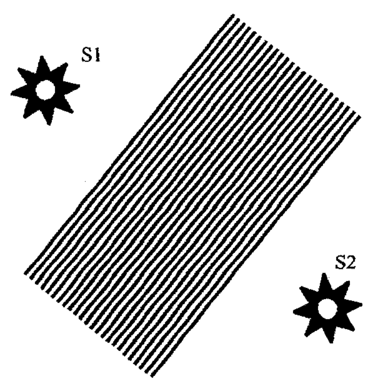
For example, in the first schematic diagram below, it shows two optical transmission members (S_1 and S_2) in a horizontal arrangement (one dimensional array of **claim 30**) so the fringes would lie vertically.



If, in the instance, that the two optical transmission members (S_1 and S_2) are in a vertical arrangement, the fringes would lie horizontally as shown in the diagram below:

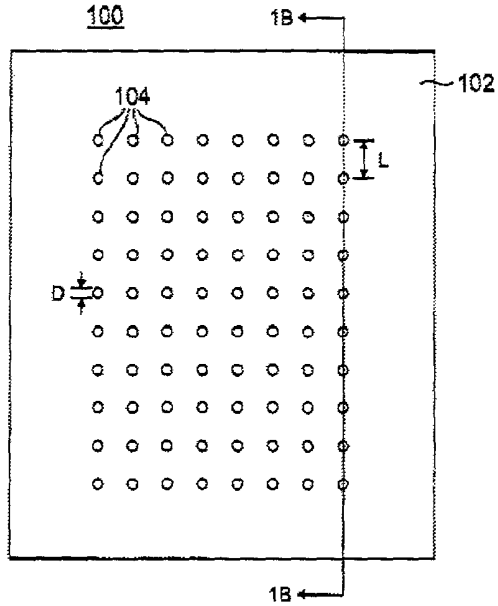


If the optical transmission members (S_1 and S_2) are at an angle to each other, the fringes would lie at the same angle as shown in the diagram below:



Thus it would be obvious to one of ordinary skill in the art that information about the relative position of the optical transmission members are obtained.

DiMascio et al (DiMascio hereinafter) show actively aligning at least one of the two or more optical transmission members (optical fibers for **claim 31**) in response to the information about the position of the two or more optical transmission members (paragraph [0026] on page 3).



At the time of the invention, one of ordinary skill in the art would have been motivated to combine the principles of Young's interferometer shown by Jenkins with Leuchs to measure positional information of the fiber optics and DiMascio to actively align at least one of the two or more optical fibers in a two dimensional array (**claim 27**) wherein the fiber optics are in different rows (**claim 29**) as shown in Figure 1A in response to the information about the position of the two or more optical transmission members.

A skilled artisan would have been motivated to do so in order to reduce the number of optical elements required for the measurement which results in simpler compact construction (Leuchs column 1, lines 54+) and the ease of aligning optical elements since Jenkins shows that Young's interferometer uses very few optical elements comprising of two pinpoint light sources taught by Leuchs (column 1, lines 55+) and a means for detecting the interference pattern.

18. **Claim 28** is rejected under 35 U.S.C. 103(a) as being unpatentable over Jenkins, Leuchs, Takishima, and DiMascio as applied to claim 27 above, and further in view of Ford.

Jenkins, Leuchs, Takishima, and DiMascio do not expressly show that any of the optical transmission members are waveguides or an array of waveguides.

Ford teaches that for optical fibers and waveguides are functional equivalents in that they both function as point sources, and because these are art-recognized equivalents, it is obvious to substitute any or all of the optical fibers with waveguides to form an array since waveguides are more compact and easier to manufacture.

19. **Claim 32** is rejected under 35 U.S.C. 103(a) as being unpatentable over Jenkins and Leuchs as applied to claim 24 above, and further in view of Ford.

Jenkins and Leuchs do not expressly show that any of the optical transmission members are waveguides but are point sources or optical fibers.

Ford teaches that for optical fibers and waveguides are functional equivalents in that they both function as point sources, and because these are art-recognized equivalents, it is obvious to substitute any or all of the optical fibers with waveguides since waveguides are more compact and easier to manufacture.

Papers related to this application may be submitted to Technology Center (TC) 2800 by facsimile transmission. Papers should be faxed to TC 2800 via the PTO Fax Center located in CP4-4C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CP4 Fax Center numbers are 703-872-9306 for regular communications and for After Final communications

If the Applicant wishes to send a Fax dealing with either a Proposed Amendment or for discussion for a phone interview then the fax should:

a) Contain either the statement "DRAFT" or "PROPOSED AMENDMENT" on the Fax Cover Sheet; and

b) Should be unsigned by the attorney or agent.

This will ensure that it will not be entered into the case and will be forwarded to the examiner as quickly as possible.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Hwa Lee whose telephone number is (703) 305-0538. The examiner can normally be reached on M-Th. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on 703-308-4881.

Andrew Lee
Patent Examiner
Art Unit 2877

December 12, 2003/ahl